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10/725,706	12/02/2003	Santosh Kumar	CMI-001	4750

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EXAMINER	
GRAHAM, KRETELIA	
ART UNIT	**PAPER NUMBER**
2827	

DATE MAILED: 07/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/725,706	KUMAR ET AL.	
	Examiner	Art Unit	
	Kretelia Graham	2827	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 December 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Applicant's claim for the benefit of a prior-filed application under 35 U.S.C. 119(e) or under 35 U.S.C. 120, 121, or 365(c) is acknowledged.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "control circuit" of **(claim 1, line 6), (claim 12, line 7) and (claim 18, line 3)** must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New

Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "200" has been used to designate both a read disk **(see page 5, line 18)** and a read head **(see page 5, line 23)**. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: **FIG. 5c: 520 (see page 7, line 5)**. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is

being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

5. The disclosure is objected to because of the following informalities:

The examiner suggests changing reference character "204" of **page 5, line 19** to "202" to properly reference the array of read heads shown in FIG. 2.

Reference character "CMR" of **page 5, line 27 and page 7, line 11** should be defined in the specification.

The examiner suggests changing reference character "304" of **page 6, line 30** to "404" in order to properly illustrate the read head of FIG. 4.

"pr" of **page 7, line 11** is a typographical error and should read "of".

Appropriate correction is required.

Claim Objections

6. Claims 7, 9-12, 16, 17, 20, and 21 are objected to because of the following informalities:

Pertaining to claim 7, the "first free layer" of **claim 7, line 2** lacks proper antecedent basis.

Pertaining to claims 9-11 and 20 the "read head" of **(claim 9, line 1), (claim 10, line 1), (claim 11, line 1), and (claim 20, line 1)** lacks proper antecedent basis.

Pertaining to claim 12, the "desired storage element" of **claim 12, line 7** and "corresponding read head" of **claim 12, line 11** lack proper antecedent basis. The examiner suggests changing "filed" of **claim 12, line 9** to "field".

Pertaining to claim 16, the "storage element" of **claim 16, line 1** lacks proper antecedent basis.

Pertaining to claim 17, for clarity of the claim the examiner suggests changing "conducting lines" of **claim 17, line 2** to "plurality of conductive lines".

Pertaining to claim 21, for clarity of the claim the examiner suggests changing "storage element" of **claim 20, line 8** to "magnetic storage element". The "resistance of the corresponding read head" of **claim 21, line 12** lacks proper antecedent basis. The examiner suggests inserting "a" between "measuring" and "resistance" of **claim 21, line 12** in place of "the" in order to establish proper antecedent basis.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Pertaining to claims 1, 18, and 21, the "corresponding read head" of **(claim 1, line 7), (claim 18, line 6), and (claim 21, line 10)** renders the claim indefinite. It is unclear as to what the claimed read head corresponds to.

Pertaining to claim 12, "...an array of magnetic storage elements disposed between the conductive lines corresponding the read heads" of **claim 12, lines 5-6** is unclear and renders the claim indefinite. It is unclear as to the relationship between the read heads and the conductive lines.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 1-6, 8-10, and 12-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over the US patent to Huai et al. (6,829,161 B2).

Pertaining to claim 1, **FIG. 2** discloses: a read disk **FIG. 2** having an array **10** of read heads **collection of layers 122, 120, 118, 116, and 114**; a storage disk **FIG. 2** having an array **10** of magnetic storage elements **collection of layers 106 and 124** wherein the read heads associate with a corresponding storage element on the storage disk; and a control circuit **30,50** to select the desired storage element that controls an orientation of a magnetic field of a corresponding read head **see column 2, lines 16-35**. **Note: The collection of layers comprising the read head corresponds to the collection of layers comprising the magnetic storage element.** However Huai fails to disclose a disk shape of the read and storage disks. It would have been an obvious matter of design choice to arrange the read heads and storage elements in a disk shape, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose, 105 USPQ 237 (CCPA 1955)*. This claim is rejected in light of the "corresponding read head" rendering the claim indefinite as discussed above in item 8.

Pertaining to claim 2, **FIG.3** further discloses: a pinned layer **112**; and a free layer **122**.

Pertaining to claim 3, **column 1, lines 22-29** further disclose: wherein the pinned layer has a fixed magnetic orientation.

Pertaining to claim 4, **column 1, lines 22-29** further disclose: wherein the free layer has a variable magnetic orientation.

Pertaining to claim 5, **FIG. 3** further discloses: wherein the storage element comprising a second free layer **124**.

Pertaining to claim 6, **column 1, lines 22-29** further disclose: wherein the second free layer has a variable magnetic orientation.

Pertaining to claim 8, **column 1, lines 38-50** further disclose: wherein a resistance of the corresponding read head is indicative of a value stored therein.

Pertaining to claim 9, **FIG. 2** further discloses: wherein the read head is an MR **Note: Magnetic element 100 comprising the read head is made of magnetoresistive materials.**

Pertaining to claim 10, **column 12, lines 62-65** further disclose: wherein the read head is a GMR.

Pertaining to claim 12, **FIG. 2 and 3** disclose: a read disk **FIG. 2** having an array **10** of read heads **100**, each read head comprising a plurality of magnetic layers **collection of layers 122, 120,118,116, and 114;** a storage disk **FIG. 2** having a plurality of conductive lines **32, 54** with an array **10** of magnetic storage elements **collection of layers 106 and 124** disposed between the conductive lines corresponding the read heads; and a control circuit **30,50** to select the desired storage element from an array of storage elements such that a current **42** through the conductive lines will induce a magnetic field in the selected storage element wherein the induced magnetic field controls a direction of magnetic field of at least one layer in the plurality of magnetic layers in the corresponding read head **see column 2, lines 16-35**. However Huai fails to disclose a disk shape of the read and storage disks. It would

have been an obvious matter of design choice to arrange the read heads and storage elements in a disk shape, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose, 105 USPQ 237 (CCPA 1955).* This claim is rejected in light of the "corresponding the read head" rendering the claim indefinite as discussed above in item 8.

Pertaining to clam 13, **FIG. 3** discloses: a pinned layer **112**; and a free layer **122**.

Pertaining to claim 14, **column 1, lines 22-29** discloses: wherein a direction of magnetic field of the pinned layer is fixed.

Pertaining to claim 15, **column 1, lines 22-29** discloses: wherein the direction of the magnetic field of the free layer is variable.

Pertaining to claim 16, **FIG. 3** discloses: wherein the storage element comprising a second free layer **124**.

Pertaining to claim 17, **column 2, lines 16-35 and column 9, lines 32-35** disclose: wherein a direction of magnetic field of the second free layer is regulated by a current through the conducting lines.

Pertaining to claim 18, **FIG. 2 and 3** are disclose: selecting a storage element **100** from an array of storage elements **10** on a storage disk **10** by a control circuit **30,50**; inducing a magnetic field in the storage element by passing current through a plurality of conducting lines **32,54** around the storage element; and controlling the magnetic field orientation of a layer **collection of layers 122, 120,118,116, and 114** in a corresponding read head by the induced magnetic filed **also see column 2, lines 16-**

35. . However Huai fails to disclose a disk shape of the read and storage disks. It would have been an obvious matter of design choice to arrange the read heads and storage elements in a disk shape, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose, 105 USPQ 237 (CCPA 1955).* This claim is rejected in light of the "corresponding read head" rendering the claim indefinite as discussed above in item 8.

Pertaining to claim 19, **FIG. 2** discloses: wherein the storage element and the layer in the corresponding read head are magnetically coupled.

Pertaining to claim 20, **column 12, lines 62-65** disclose: wherein the read head is a GMR.

Pertaining to claim 21, **FIG. 2 and 3** disclose: selecting a magnetic storage element **collection of layers 106 and 124** from an array of magnetic storage elements **10** on a storage disk **FIG. 2**; passing current through conducting lines surrounding the magnetic storage element; inducing a magnetic field around the magnetic storage element by the current through the conducting lines; setting the direction of magnetization of a second free layer in the storage element and controlling a direction of magnetization of a free layer in a corresponding read head from an array of read head on a read disk **FIG. 2** by the induced magnetic filed **see column 2, lines 16-35**; and measuring the resistance of the corresponding read head **see column 2, lines 52-54. .** However Huai fails to disclose a disk shape of the read and storage disks. It would have been an obvious matter of design choice to arrange the read

heads and storage elements in a disk shape, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose, 105 USPQ 237 (CCPA 1955).* This claim is rejected in light of the "corresponding read head" rendering the claim indefinite as discussed above in item 8.

11. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over the US patent to Huai as applied to claim 1 above, and further in view of the US patent to Gill (5,751,521). Huai discloses all of the claim limitations except: wherein the magnetic orientation of the first free layer is regulated by the magnetic orientation of the second free layer. **Column 7, lines 64-67 – column 8, lines 1-2** of Gill discloses: wherein the magnetic orientation of the first free layer is regulated by the magnetic orientation of the second free layer. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the magnetic element of Huai with the magnetic orientation scheme of Gill, since Gill indicates at **column 2, lines 47-52** that such a modification allows the magnetic orientation of first and second magnetic free layers to rotate together.

12. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over the US patent to Huai as applied to claim 1 above, and further in view of the US patent to Mao et al. (7,035,062 B1). Huai discloses all of the claim limitations except: wherein the read head is a CMR. **Column 1, lines 38-42** of Mao disclose: wherein the read head is a

CMR. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the device of Huai with the CMR read head of Mao in order to increase storage capacity.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kretelia Graham whose telephone number is (571) 272-5055. The examiner can normally be reached on Mon-Fri 8am-4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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